

24. A New Species of *Æsophagostomum* (*Æsophagostomum xeri*, sp. n.) from a Rodent (*Xerus setosus*). By R. J. ORTLEPP, M.A., Research Assistant, Helminthological Dept., London School of Tropical Medicine; Hon. Parasitologist to the Society.

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(Text-figures 1-6.)

In January 1922, I collected a number of Nematode parasites from the cæca of two Bristly Ground Squirrels (*Xerus setosus*) which had been received from South Africa, a month previously, by the Zoological Society, Regent's Park, London. These parasites comprised 11 males and 17 females. They were irregularly distributed in the cæcal contents.

In the specimens, which were all killed by immersion in hot 70 per cent. alcohol, the anterior end of the body is bent ventrally in the form of a hook.

The *cuticle* is transversely striated, the distance between the most anterior striae being slightly over 7μ ; this distance increases posteriorly until a maximum of 27μ is reached at about one-seventh of the total length of the worm; after this the distance gradually diminishes, so that in the middle of the body it is 12μ and at the hinder end 7μ .

A *mouth collar* (text-figs. 1 & 2) is present; this is broad and shallow, its depth being less than half its breadth. Immediately behind it there is a well-marked *vesicular swelling* about as long as it is broad, but sometimes slightly longer than broad (text-fig. 1). Transversely it shows fine cuticular striations. It is terminated behind at a distance of about 220μ from the anterior end by a cervical constriction of the cuticle; this constriction almost encircles the worm except for a short space on the dorsal surface.

Two *cervical papillæ* are present; these are small, and are situated behind the middle of the œsophagus at about the anterior margin of the posterior third of the œsophagus.

There are no *lateral alæ*.

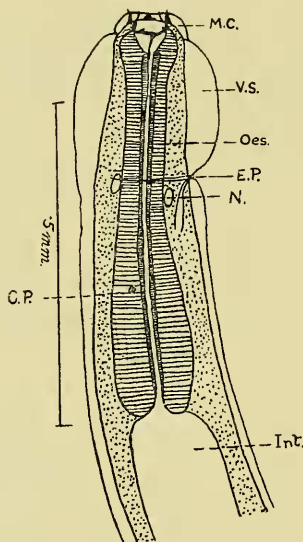
The females are slightly longer and thicker than the males, measuring on an average 15 mm. in length, the smallest being 13 mm. and the largest 16.5 mm. long. In the males the average length is 13 mm., the smallest being 12 mm. and the largest 14 mm.

The females have their maximum breadth at the junction of the posterior and middle thirds of the body, and this breadth in a female 16 mm. long is 510μ . From this point the body tapers

towards the anterior end until it reaches the posterior margin of the vesicular swelling, where it is then 190μ broad. Posteriorly the narrowing is more gradual until the level of the vaginal opening, where the breadth is 360μ ; from here the narrowing is very marked, and ends in a pointed tail.

In a male 12.5 mm. long the breadth of the body at the base of the vesicular swelling is 170μ . From here the breadth increases until a maximum of 380μ is reached about half-way down the length of the worm; posteriorly the body tapers until the anterior margin of the bursa is reached, where the breadth is then 227μ .

Text-figure 1.



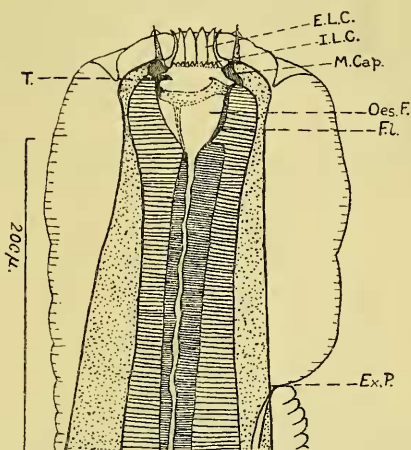
Lateral view of anterior end of body.

C.P. = position of cervical papilla; E.P. = excretory pore; Int. = intestine; M.C. = mouth collar; N. = nerve ring; Oes. = oesophagus; V.S. = vesicular swelling.

The mouth collar surrounds the *mouth capsule* (text-fig. 2); this latter is a chitinous structure whose breadth is about three times its depth; it is somewhat cylindrical in shape, having its anterior opening slightly smaller than its posterior; anteriorly it bears a crown of ten large leaf elements, which pass through the mouth and whose extremities are slightly recurved over the anterior part of the mouth collar. An internal leaf-crown is present, and it consists of about twice as many small elements as the external leaf-crown. The mouth aperture is surrounded by the usual six papillae, two short and broad laterals, and four longer submedians which pierce the mouth collar.

A well-developed *oesophageal funnel* is present; this is goblet-shaped and is lined with chitin. The anterior margin of the funnel has a thickened chitinous rim having an undulating outline. Because of these undulations the depth of the

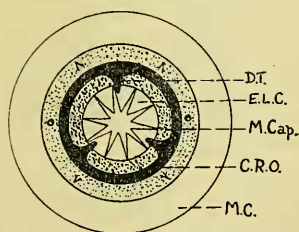
Text-figure 2.



Optical section of head, lateral view.

E L.C. = external leaf-crown; Ex.P. = excretory pore; Fl. = oesophageal flange; I.L.C. = internal leaf-crown; M.Cap. = mouth capsule; Oes.F. = oesophageal funnel; T. = dorsal tooth.

Text-figure 3.



Frontal view of head, diagrammatic.

C.R.O. = chitinous rim of oesophageal funnel; D.T. = dorsal tooth; E.L.C. = external leaf-crown; M.C. = mouth collar; M.Cap. = mouth capsule.

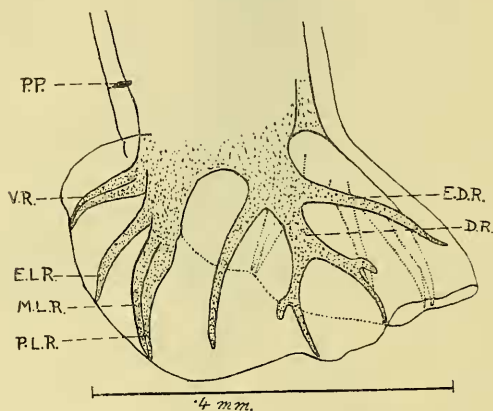
mouth capsule, which rests on the rim, is not everywhere the same. From the anterior border of this rim arise three recurved tooth-like processes, each about 7μ long, situated one on the summit of each of the three undulations; these processes are situated one dorsal and two latero-ventral, the three, however, being

equidistant (text-fig. 3). The chitinous lining of the funnel is provided with three flange-like chitinous plates, projecting into the lumen in a longitudinal direction; each flange is situated about half-way between each pair of tooth-like processes.

The funnel passes into the oesophageal lumen, which, from its commencement, is triradiate in transverse section, the sides of each ray being strongly chitinized. The *oesophagus* (text-fig. 1) is a little less than $\frac{1}{5}$ of the total length of the worm; it is slightly swollen anteriorly round the funnel; posteriorly it becomes gradually thickened, and assumes the form of a club, its greatest diameter being $110\ \mu$.

The *intestine* which follows has a dark colour; it passes straight backwards to open to the exterior by a short rectum lined internally with chitin.

Text-figure 4.



Dorso-lateral view of male genital bursa.

D.R. = dorsal ray; E.D.R. = externo-dorsal ray; E.L.R. = externo-lateral ray; M.L.R. = medio-lateral ray; P.L.R. = postero-lateral ray; P.P. = prebursal papilla; V.R. = ventral rays.

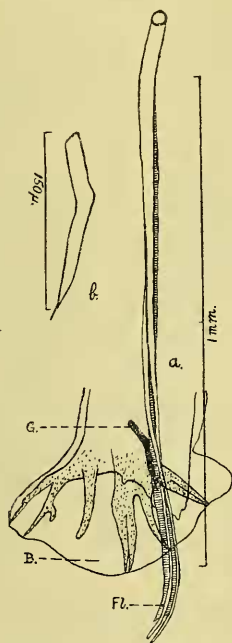
The *nerve ring* is situated just behind the level of the cervical groove, its dorsal part being slightly more anterior than its ventral.

In the cervical groove, on the ventral surface, is situated the opening of the *excretory duct*; this duct passes obliquely backwards and inwards, and in so doing passes over the ventral surface of the nerve ring.

The *male genital bursa* is ample, forming about $\frac{1}{3}$ part of the length of the worm and being nearly twice as broad as it is deep (text-fig. 4). It consists of two lateral lobes united by a small median dorsal lobe. In each lateral lobe are situated six rays. The two ventral rays are of the same size, run parallel, and are closely

apposed to each other to the rim of the bursa. The postero-lateral and medio-lateral rays are also equal in size, and pass to the edge of the bursa closely parallel to each other. The externo-lateral ray diverges from the other lateral rays, so that eventually its tip is about one-third of the distance between the medio-lateral and latero-ventral rays. From the main trunk of the dorsal ray, about half-way between its root and its bifurcation, the externo-dorsal ray takes its origin; it also passes into the lateral bursal lobe, but terminates a short distance from the margin of the bursa. The dorsal ray supports the median lobe of the bursa. Its base

Text-figure 5.



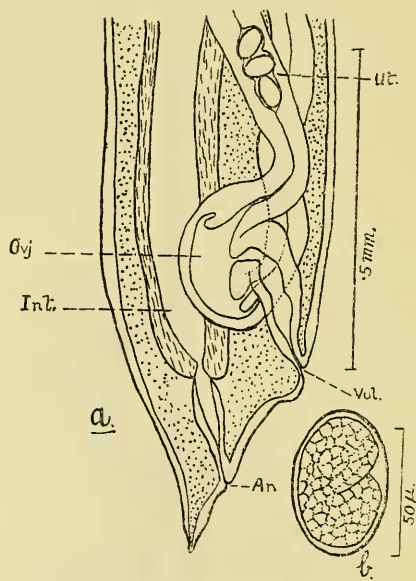
a = spicules *in situ*. B. = bursa; Fl. = spicular flange; G. = gubernaculum.
b = side view of gubernaculum.

is stout and about $56\ \mu$ in diameter, but after the origin of the externo-dorsal ray it is only about half this breadth. It is about $230\ \mu$ long and bifurcates at its middle, and each branch so formed bears on its outer margin a short, somewhat elbowed branch which is slightly thicker than the rest of the main branch.

The *spicules* (text-fig. 5 *a*) are long and tubular, and are protruded some considerable distance in almost all the males obtained. They are similar and of equal length, measuring 1.29 mm. long, more or less straight, and both end in a sharp point.

The terminal third of each spicule is wound round its fellow, and its tip is slightly bent. Each spicule is provided with a thin chitinous and finely transversely striated flange; this flange starts near the base of the spicule and accompanies it almost to its tip. It becomes broader posteriorly, having its maximum breadth—about 15μ —at its termination, which is about 50μ from the tip of the spicule. A *gubernaculum* (text-fig 5 b) is present; this in side view is boomerang-shaped, with the posterior end terminating in a sharp point. Along its outer curve it is 170μ long, and its maximum depth (at the bend) is 17μ .

Text-figure 6.



a = lateral view of posterior extremity of female. An. = anus; Int. = intestine; Ovjector; Ut. = uterus; Vul. = vulva. *b* = egg, just after being deposited.

Two small *prebursal papillae* are present, one on either side somewhat ventral, about 170μ in front of the anterior margin of the lateral bursal lobe.

The posterior end of the female (text-fig. 6 *a*) tapers abruptly, so that the tail is relatively short, measuring 114 – 142μ or about $\frac{1}{11.5}$ of the total length. Near its tip there is situated on either side a small caudal papilla.

The *vaginal aperture* (text-fig. 6 *a*) is circular, and is situated a short distance— 245μ —in front of the anus. The cuticle bordering its posterior margin is slightly protruded. The vagina is roughly sigmoid in shape and is about 240μ long. Its lumen

is lined with chitin. The ovijectors lie in an antero-posterior direction, being however slightly obliquely placed from side to side. Inclusive of its sphincters, it measured, in a ♀ 15 mm. long, $535\ \mu$. The right uterus terminates in the anterior ovijector; the terminal portion of the posterior ovijector is bent slightly forward, and the left uterus, which meets it, passes down the body parallel to that of the right.

The eggs (text-fig. 6*b*) are oval, thin-shelled, and of medium size, measuring on an average $58 \times 39\ \mu$. They commence their development *in utero* and, when laid, the embryo has just formed.

Since writing the above description, I have obtained from nodules in the cæcum of a third Ground Squirrel, representatives of a larval stage of *O. xeri*, sp. n. These larvæ were all females and almost full-grown, being only slightly smaller than the adult forms. From this it would appear that the larval stages, as in several other Œsophagostomes, are also passed inside the tissues of the digestive tract.

From the above description it is apparent that this parasite belongs to the genus *Œsophagostomum*; further, the characters of the mouth capsule and the œsophageal funnel with its armature show that it is closely related to *Œ. apiostomum*. It, however, differs from *Œ. apiostomum* in two important respects: namely (1) the spicules of the male are much longer, measuring nearly $1300\ \mu$, whereas in *Œ. apiostomum* they are less than a millimetre; (2) the tail of the female is much more abruptly pointed than in *Œ. apiostomum*; in the latter the distance from the anus to the tip of the tail is greater than that from the anus to the vulva, whereas in the new form just the reverse is the case. These two characters are constant in all the parasites collected, and may thus be regarded as of specific significance, especially also as these parasites seem to be normal in a host belonging to a group of mammals from which no Œsophagostomes had previously been recorded. For this parasite I propose the name

Œsophagostomum xeri, sp. n.,

with the following specific description:—*Œsophagostomum*. Males about 13 mm. and females about 15 mm. long. The maximum breadth of the male is about midway, and is $\frac{1}{3\frac{1}{3}}$ of the total length; in the female the maximum breadth of about $\frac{1}{3\frac{1}{6}}$ the total length is reached at the junction of the posterior and middle thirds of the body. Cuticle transversely striated. Mouth collar about twice as broad as it is deep. Cervical swelling about as long as it is broad. Lateral alæ absent. Cervical papillæ situated at the level of the anterior margin of the posterior third of the œsophagus. External leaf-crown of 10 elements; internal leaf-crown small, and of about twice as many elements. Œsophageal funnel well-developed; its anterior margin thickened, and carrying three recurved tooth-like processes—two subventral and one dorsal.

Three longitudinal chitinous ridges project into the lumen of funnel. The tail of the female is abruptly pointed, so that the distance from the anus to the tip of the tail is shorter than that from the anus to the vulva. Female genitalia typical for the genus. Male bursa of the usual *Æsophagostome* type. Spicules long, tubular, and simple, over $1\frac{1}{4}$ mm. long, and each is provided with a lateral flange. Larval stages occur in nodules in the wall of the cæcum.

Habitat. Cæcum of *Xerus setosus* (South Africa).

On looking through the literature of *Æsophagostomes*, I find that Parona and Stossich in 1901 described as *Æsophagostomum tuberculatum* a parasite from *Dasypus villosus* (Argentina). I have compared their description and figures with some parasites I obtained from the same host, and I am satisfied that the parasites collected by me are the same; further, I am able to state that this parasite is not an *Æsophagostomum*, but probably the representative of a new *Trichostrongyle* genus.

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